

ADA 054455

AD NO.

DDC FILE COPY

FOR FURTHER TRANSMISSION

A052188

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

DR-965  
MARCH 1978

AD

(12)

METEOROLOGICAL DATA REPORT

19301A GSRS  
MISSILE NO. V-2, ROUND NO. V-2  
(9 DECEMBER 1977)\*

BY

WSMR METEOROLOGICAL TEAM

\* THIS SUPersedes DR-956

D D C  
RECORDED  
MAY 30 1978  
FILED

ATMOSPHERIC SCIENCES LABORATORY  
WHITE SANDS MISSILE RANGE, NEW MEXICO

ECCOM  
UNITED STATES ARMY ELECTRONICS COMMAND

DISPOSITION INSTRUCTIONS

Destroy this report when it is no longer  
needed. Do not return to the originator.

DISCLAIMER

The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

The citation of trade names and names of manufacturers in this report is not to be construed as official Government endorsement or approval of commercial products or services referenced herein.

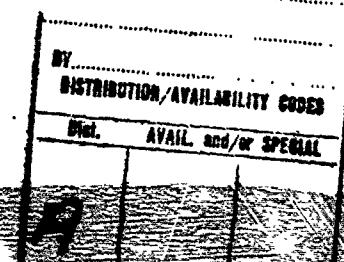
**UNCLASSIFIED**

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ECOM-DR-965	2. GOVT. ACCESSION NO. <i>(Signature)</i>	3. RECIPIENT'S CATALOG NUMBER <i>(Signature)</i>
4. TITLE (continued) 19301A GSRS, Missile Number V-2, Round Number V-2 This superseded DR-956	5. TYPE OF REPORT & PERIOD COVERED <i>(Signature)</i>	
6. AUTHOR(s) WSMR Meteorological Team	7. CONTRACT OR GRANT NUMBER(s) DA Task 1T665702D127-02 <i>(Signature)</i>	
8. PERFORMING ORGANIZATION NAME AND ADDRESS	9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS <i>(Signature)</i>	
10. CONTROLLING OFFICE NAME AND ADDRESS US Army Electronics Command Atmospheric Sciences Laboratory White Sands Missile Range, NM	11. REPORT DATE Mar 1978	
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) US Army Electronics Command Ft. Monmouth, NJ	13. NUMBER OF PAGES 25	
14. DISTRIBUTION STATEMENT (of this Report)	15. SECURITY CLASS (of this report) UNCLASSIFIED	
16. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
17. SUPPLEMENTARY NOTES		
18. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
1. Ballistics 2. Meteorology 3. Wind		
19. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Meteorological data gathered for the launching of 19301A GSRS, Missile No. V-2, Round No. V-2, are presented in tabular form.		
<p style="text-align: right;"><i>401 844</i></p> <p style="text-align: right;">REF ID: A65181</p>		

## CONTENTS

	PAGE
INTRODUCTION -----	1
DISCUSSION -----	1
LC METEOROLOGICAL SITE DESCRIPTION -----	2
 TABLES	
I. Surface Observations taken at WSD -----	3
II. RAPTS-T-9 Pilot-Balloon-Measured Wind Data, LC-33 at 0930 MST -----	4
III. RAPTS-T-9 Pilot-Balloon-Measured Wind Data, SMR at 0938 MST -----	6
IV. RAPTS-T-9 Pilot-Balloon-Measured Wind Data, APACHE at 0945 MST -----	8
V. Anemometer-Measured Wind Speed and Direction, 38.7 FT -----	9
VI. Anemometer-Measured Wind Speed and Direction, 53.0 FT -----	10
VII. Anemometer-Measured Wind Speed and Direction, Tower Level 12 FT -----	11
VIII. Anemometer-Measured Wind Speed and Direction, Tower Level 62 FT -----	12
IX. Anemometer-Measured Wind Speed and Direction, Tower Level 102 FT -----	13
X. Anemometer-Measured Wind Speed and Direction, Tower Level 202 FT -----	14
XI. SMR Significant Level Data (Release Time: 0930 MST) -----	15
XII. SMR Upper Air Data (Release Time: 0930 MST) -----	16
XIII. SMR Mandatory Levels (Release Time: 0930 MST) -----	18



THIS PAGE IS BLANK-NOT FILLED

## INTRODUCTION

19301A GSRS, Missile Number V-2, Round Number V-2, was launched from launcher 519 at LC-33, White Sands Missile Range (WSMR), New Mexico at 0931 HRS MST, 9 December 1977. The scheduled launch time was 0930 HRS MST.

## DISCUSSION

Meteorological data were recorded and reduced by the White Sands Meteorological Team, Atmospheric Sciences Laboratory (ASL), White Sands Missile Range, New Mexico. The data were obtained by the following methods:

### 1. Observations

#### a. Surface

(1) Standard surface observations to include pressure, temperature ( $^{\circ}\text{C}$ ), relative humidity, dew point ( $^{\circ}\text{C}$ ), density ( $\text{gm}/\text{m}^3$ ), wind direction, wind velocity and cloud cover were made at the LC-33 Met Site at T-0 mins.

(2) Anemometer data were provided from existing pole mounted and tower mounted anemometers at LC-33. Monitor of wind speed and direction from one anemometer was also provided in the launch control room.

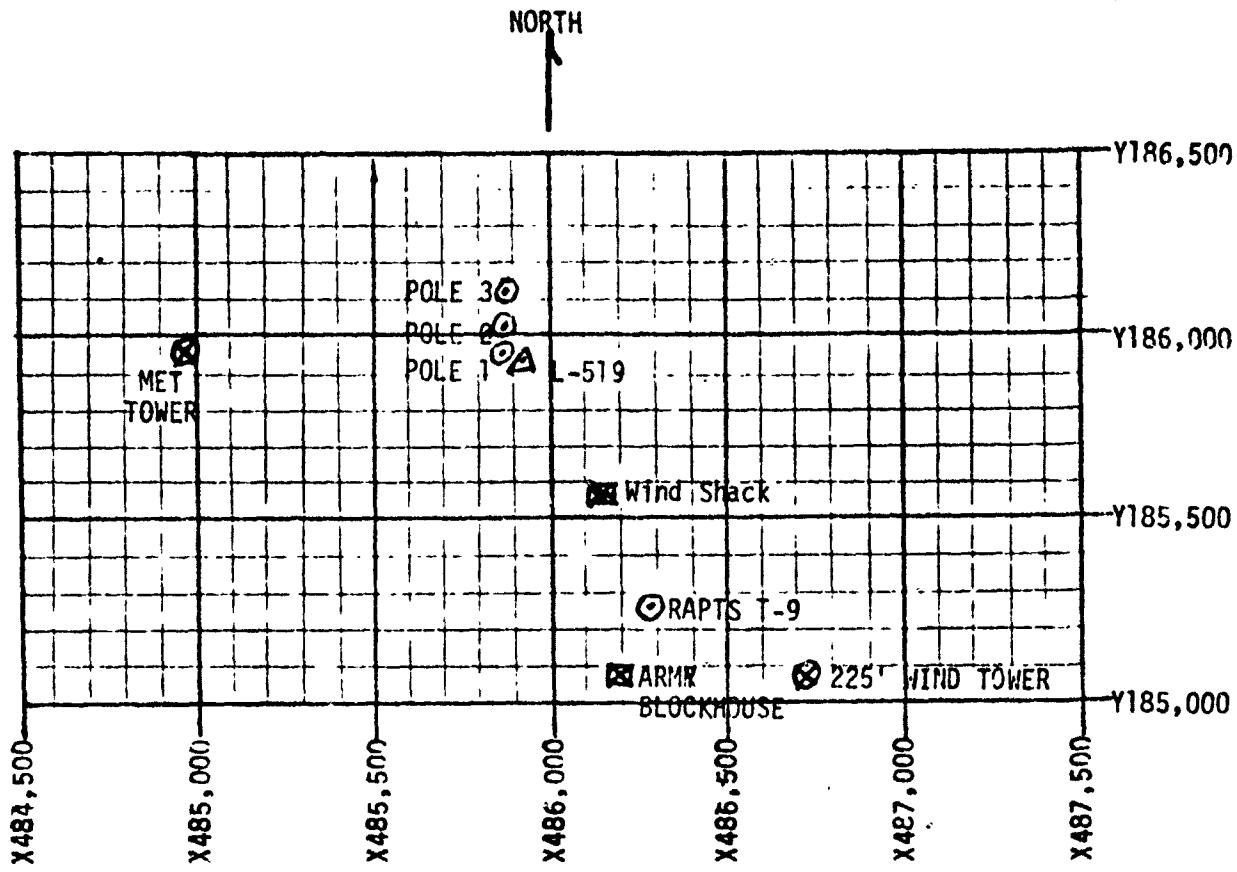
#### b. Upper Air

(1) Low level wind data were obtained from RAPTS-T-9 pibal observations at T-0 mins as follows:

### SITE & ALT.

LC-33 900 meters (15 meter incs)  
APA 900 meters (30 meter incs)  
SMR 900 meters (30 meter incs)

(2) Air structure data (rawinsonde) were collected at the SMR Met Site at T-0 mins. Data were collected from surface to 125% of apogee in 100 meter incs.



1. MET TOWER - 4 Bendix Model T-120 Anemometers at 12 ft, 62 ft, 102 ft and 202 ft with E/A recorders in Wind Shack.
2. POLE ANEMOMETER - Bendix Model T-120 with E/A recorders in Wind Shack
  - (a) Pole #1 - 38.7 ft
  - (b) Pole #2 - 53.0 ft
  - (c) Pole #3 - 83.6 ft
3. 225 FT WIND TOWER - 5 Bendix Model T-120 Anemometers at 35 ft, 88 ft, 128 ft, 168 ft and 200 ft with 5 X-Y visual indicators in Blockhouse.
4. RAPTS T-9 - Radar Automatic Pilot-Balloon Tracking System T-9 Radar

The data are presented in the following tabulations:

ELEVATION	3,990	FEET/MSL
PRESSURE	876.2	MBS
TEMPERATURE	17.9	°C
RELATIVE HUMIDITY	22	%
DEW POINT	-4.1	°C
DENSITY	1,049	GM/M <sup>3</sup>
WIND SPEED/DIR	CALM	
CLOUD COVER	CLEAR	

TABLE I. SURFACE OBSERVATIONS TAKEN AT WSD,  
1004 HRS MST/9 DECEMBER 1977

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)	HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	155	10	1050	158	11
50	132	08	1100	165	11
100	140	08	1150	172	11
150	145	07	1200	176	11
200	151	07	1250	177	11
250	165	06	1300	178	11
300	180	06	1350	179	11
350	180	06	1400	179	11
400	180	06	1450	184	11
450	171	07	1500	187	12
500	163	07	1550	191	12
550	164	07	1600	193	13
600	164	08	1650	195	13
650	153	09	1700	196	13
700	145	10	1750	191	14
750	142	12	1800	186	16
800	140	13	1850	183	17
850	142	13	1900	181	16
900	144	12	1950	182	15
950	147	12	2000	183	15
1000	151	11	2050	188	17

TABLE II. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA  
RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 486,296.83    Y = 185,251.85    Z = 3,986.67

APPROXIMATELY: 815 FEET SSE OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)	HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
2100	191	20	2600	183	18
2150	193	21	2650	188	18
2200	194	21	2700	192	18
2250	190	20	2750	196	17
2300	184	19	2800	201	16
2350	185	20	2850	195	12
2400	186	20	2900	184	08
2450	185	19	2950	178	08
2500	182	19	3000	171	07
2550	182	19			

TABLE II. (CONT)

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)	HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	200	06	2100	182	19
100	041	01	2200	190	17
200	052	03	2300	183	17
300	150	10	2400	186	21
400	167	10	2500	184	23
500	163	10	2600	177	24
600	164	08	2700	195	20
700	168	07	2800	193	13
800	175	10	2900	196	12
900	175	10	3000	202	12
1000	183	09	3100	205	05
1100	188	09	3200	207	05
1200	175	06	3300	184	05
1300	166	10	3400	186	06
1400	161	10	3500	188	10
1500	182	13	3600	199	08
1600	197	14	3700	188	05
1700	177	16	3800	188	09
1800	175	13	3900	195	06
1900	182	18	4000	203	05
2000	173	20	4100	264	03

TABLE III. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA  
RELEASED FROM SMR, AT 0938 MST/9 DECEMBER 1977  
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 472,441.28    Y = 214,137.54    Z = 3,999.00

APPROXIMATELY: 7 MILES NNW OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
4200	333	01
4300	357	06
4400	347	06
4500	337	12
4600	330	08
4700	312	09
4800	292	06
4900	276	10
5000	291	07
5100	315	09
5200	310	08
5300	274	11
5400	272	07
5500	265	08
5600	279	11

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
5700	290	07
5800	271	11
5900	258	11
6000.	219	07
6100	224	10
6200	247	09
6300	237	10
6400	248	08
6500	244	08
6600	277	08
6700	250	10
6800	241	09
6900	271	10
7000	275	10

TABLE III. (CONT)

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)	HEIGHT (FEET)	DIRECTION (DEGREES)	SPEED (MPH)
SUR	180	12	1600	175	25
100	205	11	1700	180	29
200	210	19	1800	175	31
300	190	25	1900	165	35
400	175	24	2000	165	35
500	160	25	2100	165	37
600	165	24	2200	165	38
700	160	26	2300	160	33
800	160	24	2400	165	28
900	190	15	2500	165	29
1000	190	17	2600	165	28
1100	160	25	2700	175	23
1200	155	28	2800	175	16
1300	160	31	2900	160	09
1400	165	26	3000	155	08
1500	175	24			

TABLE IV. RAPTS-T-9 PILOT-BALLOON-MEASURED WIND DATA  
RELEASED FROM APACHE, AT 0945 MST/9 DECEMBER 1977  
19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

PIBAL RELEASE POINT WSTM COORDINATES:

X = 481,338.60 Y = 267,644.40 Z = 3,962.07

APPROXIMATELY: 16 MILES NORTH OF LAUNCHER.

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	7	145
-20.0	10	162
-10.0	11	152
-00.00	8	158
+10.00	8	144
+20.00	12	139
+30.00	12	148

TABLE V. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, POLE 38.7 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 485,874.29 Y = 185,958.90 Z = 4,018.74

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	9	142
-20.0	13	169
-10.0	13	163
-00.00	15	147
+10.00	11	142
+20.00	17	143
+30.00	15	157

TABLE VI. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, POLE 53.0 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 485,874.93 Y = 186,012.00 Z = 4,033.57

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	8	M
-20.0	8	M
-10.0	10	M
-00.00	10	M
+10.00	8	M
+20.00	12	M
+30.00	12	M

TABLE VII. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 12 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	12	133
-20.0	13	136
-10.0	12	132
-00.00	13	132
+10.00	11	135
+20.00	11	141
+30.00	13	136

TABLE VIII. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 62 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	14	132
-20.0	12	135
-10.0	11	147
-00.00	11	144
+10.00	15	133
+20.00	13	129
+30.00	13	137

TABLE IX. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 102 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

T-TIME (SEC)	SPEED (MPH)	DIR DEG
-30.0	11	148
-20.0	12	140
-10.0	10	143
-00.00	11	120
+10.00	14	133
+20.00	15	135
+30.00	14	128

TABLE X. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION, TOWER LEVEL 202 FT  
 RELEASED FROM LC-33, AT 0930 MST/9 DECEMBER 1977  
 19301A GSRS, MISSILE NO. V-2, ROUND NO. V-2

WSTM COORDINATES: X = 484,982.64 Y = 185,957.73 Z = 3,983.00

NOTE: WIND DIRECTION DATA ARE REFERENCED TRUE NORTH.

STATION ALTITUDE 5947.3 FEET MSL  
DEC. 77 0930 HRS MST  
ASCENSION NO. 170

SIGNIFICANT LFVFL DATA  
545000CC170  
S M R  
TABLE XI.

GEOMETRIC COORDINATES  
32.48034 LAT NFG  
106.42307 LON FEG

PRESSURE MILLIBARS	GEOMETRIC ALITUDE MSL FEET	TEMPERATURE AIR DEGREES CENTIGRADE	REL. HUM. PERCENT
887.3	3997.3	8.5	49.0
884.8	4077.2	5.1	31.0
865.3	4671.6	3.1	40.0
850.0	5146.5	3.7	39.0
814.8	6274.9	4.5	35.0
793.3	6994.9	9.0	14.7
747.3	8615.5	8.9	12.0
700.0	10375.1	4.5	15.9
682.3	11058.0	4.4	16.0
637.8	12641.6	-0.5	21.2
621.3	13528.4	-0.2	23.4
522.8	17964.1	-10.7	29.4
507.0	19385.1	-11.9	31.3
463.3	20981.4	-16.1	34.3

BEST AVAILABLE COPY

STATION ALTITUDE 3947.30 FEET MSL  
9 DEC. 77 U930 HRS MST  
ASCENSION NO. 173

UPPER AIR DATA  
5433060170  
S M R  
TABLE XII.

GEOMETRIC COORDINATES  
32°48'03" LAT DEG  
106°42'30" LON DEG

BEST AVAILABLE COPY

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	DELPONT CENTIGRADE	RFL.HUM. PERCENT	DENSITY GM/ CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TH)	SPEED KNOTS	INDEX OF REFRACTION
3997.3	887.3	9.5	-1.6	49.0	1094.9	654.6	180.0	6.0	1.000270
4000.0	887.2	8.4	-1.9	48.4	1095.3	654.4	180.0	6.0	1.000259
4500.0	870.9	3.7	-9.5	37.4	1094.5	648.6	184.3	7.4	1.000255
5000.0	854.7	3.5	-9.0	34.3	1074.7	646.4	187.2	6.7	1.000253
5500.0	838.6	4.0	-9.1	37.7	1053.1	649.0	189.4	10.1	1.000245
6000.0	823.2	4.3	-9.4	36.0	1032.2	649.4	190.3	11.0	1.000236
6500.0	808.0	5.9	-10.6	29.4	1007.4	651.2	186.5	8.9	1.000227
7000.0	793.2	9.0	-14.7	17.0	976.4	654.7	184.5	6.5	1.000224
7500.0	778.7	9.0	-14.1	17.9	960.6	654.7	208.5	2.2	1.000220
8000.0	764.4	6.9	-13.5	16.4	943.1	654.7	296.9	2.6	1.000217
8500.0	750.5	6.4	-12.4	14.8	925.9	654.7	303.8	5.2	1.000214
9000.0	736.7	7.9	-13.5	20.2	912.0	653.5	293.1	6.5	1.000210
9500.0	723.1	6.7	-14.3	20.5	899.3	652.0	277.4	7.4	1.000207
10000.0	709.6	5.4	-15.2	20.8	886.7	650.6	267.7	6.7	1.000203
10500.0	696.7	4.5	-16.0	20.8	873.4	649.4	261.4	10.2	1.000199
11000.0	683.8	4.4	-16.2	20.1	857.4	649.3	260.9	11.0	1.000196
11500.0	671.0	3.2	-17.7	19.8	845.2	647.9	263.0	11.2	1.000192
12000.0	656.4	1.8	-19.0	19.5	833.6	646.6	266.6	10.8	1.000189
12500.0	646.1	.4	-20.3	19.2	822.1	644.6	271.9	10.1	1.000186
13000.0	634.0	-5	-21.8	18.1	809.5	643.5	272.5	10.8	1.000181
13500.0	622.0	-5	-23.6	15.2	794.2	643.4	270.6	12.3	1.000179
14000.0	610.0	-1.6	-24.4	15.5	782.1	642.2	269.8	13.8	1.000176
14500.0	598.2	-2.7	-24.9	16.1	770.3	640.6	269.3	15.3	1.000173
15000.0	586.7	-3.9	-25.5	16.7	758.7	639.4	268.5	16.4	1.000170
15500.0	575.4	-5.0	-26.1	17.2	747.3	638.1	267.6	17.2	1.000168
16000.0	564.2	-6.4	-26.7	17.8	736.1	636.7	267.5	18.2	1.000165
16500.0	553.5	-7.3	-27.3	16.5	725.0	635.3	267.5	19.1	1.000162
17000.0	542.8	-8.5	-27.9	18.9	714.1	633.4	270.8	19.6	1.000160
17500.0	532.3	-9.6	-28.6	14.5	703.4	632.5	274.9	20.0	1.000157
18000.0	522.1	-10.7	-29.3	14.9	692.6	631.2	278.9	20.6	

STATION ALTITUDE 3997.3 FEET MSL  
9 DEC. 77 0930 HRS MST  
ASCENSION NO. 17U

UPPER AIR DATA  
5450060170  
S W R  
TABLE XII. (CONT)

GEOMETRIC COORDINATES  
32°48'03" LAT NEG  
106°42'30" LON DEG

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEWPONT DEGREES CENTIGRADE	REFL.HUM. PERCENT	DENSITY GM/CURIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(EAST)	WIND DATA SPEED KNOTS	INDEX OF REFRACTION
16500.0	511.8	-11.3 -30.2	19.0	660.5	630.0	282.7	21.3	1.000154
19000.0	301.7	-11.8 -31.2	18.2	663.2	629.7	<84.0	21.4	1.000151
19500.0	491.7	-12.6 -32.0	16.2	657.8	626.7			1.000149
20000.0	481.9	-13.9 -32.8	18.5	641.5	627.5			1.000146
20500.0	472.4	-15.0 -33.5	16.7	637.3	626.6			1.000144

BEST AVAILABLE COPY

STATION ALTITUDE 3997.30 FEET MSL  
9 DEC. 77 0930 HRS MST  
ASCENSION NO. 170

MANDATORY LEVELS  
5453060170  
S M P  
TABLE XIII.

GEODETIC COORDINATES  
32°46'03.4" LAT DEG  
106°42'30.7" LON DEG

PRESSURE	GEOPOTENTIAL	TEMPERATURE	REL.HUM.	WIND DATA
MILLIBARS	FEET	AIR DEGREES C FT/IGRANE	PERCENT	DIRECTION DEGREES(T4)
850.0	5145.	30.7	-8.9	39. 187.9 4.1
600.3	6766.	7.6	-12.4	23. 183.7 7.9
750.0	8517.	8.9	-12.9	20. 303.9 5.4
700.0	10375.	4.5	-15.9	21. 262.7 9.9
650.0	12345.	.9	-19.9	19. 270.3 10.3
600.0	14442.	-2.6	-24.9	16. 269.3 15.2
550.0	16684.	-7.7	-27.5	19. 268.2 14.4
500.0	19093.	-11.9	-31.3	18. 284.3 21.4

BEST AVAILABLE COPY